

## Serological Survey of Children in Moscow for Antibody to Polioviruses, 1961 and 1962

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*In 1961 and 1962, 2-3 years after mass-vaccination campaigns with live Sabin poliovirus, mass serological surveys for poliovirus antibodies in the child population of Moscow were carried out. A total of 605 and 769 children aged from 6 months to 15 years were examined in autumn 1961 and autumn 1962, respectively. The results showed that neutralizing antibodies had been produced in 97-100 % of the children vaccinated, but that there appeared to be some deficiency in antibody response in children under 2 years of age. Precipitating and complement-fixing antibodies were found in a considerable proportion of normal children after revaccination, indicating the occurrence of fresh infection. This was considered a manifestation of insufficient resistance of the alimentary tract, and suggests that the possibility of such reactions occurring after revaccination should be taken into account in the serodiagnosis of poliomyelitis and similar diseases.*

In Moscow, mass immunization against poliomyelitis was first carried out with live vaccine (prepared from attenuated Sabin strains) in the winter of 1959-60. All the susceptible population under 20 years of age received monovalent vaccines of types 1, 2 and 3, followed by a trivalent vaccine incorporated into sweets, at intervals of 1-3 months. In the winter of 1960-61, revaccination with a bivalent vaccine of types 1 and 3, followed after 1-2 months by a trivalent vaccine, was carried out. In winter 1961-62, children under 10 years of age received two feedings of trivalent vaccine.

For infants, the primary immunization schedule was usually as follows: monovaccine of type 1 at 2 months, of type 3 at 4 months and of type 2 at 6 months; and trivaccine at 8-12 months (some of the infants received 3-4 feedings of trivalent vaccine). During 1960-62, however, the first dose of vaccine was administered to certain infants as early as during the first days of life.

The purpose of the investigation described in this paper was to determine the immunological status of the child population of Moscow in the autumn of 1961 and in the autumn of 1962.

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### MATERIALS AND METHODS

For the main serological surveys, blood samples were collected from children of 6 months to 15 years of age (605 in 1961 and 769 in 1962), regardless of the number of vaccine feedings received. In addition, for a special investigation of the effect of early vaccination, serum specimens were obtained from 109 infants of 9-18 months of age who had been vaccinated shortly after birth. In 1961, the blood was collected with a syringe from the cubital vein; in 1962, it was taken from the finger. The serological tests performed were: the pH neutralization test (Salk, Youngner & Ward, 1954); the tube complement-fixation test (Schmidt & Lennette, 1955; Chumakova, 1958); and the precipitation test in agar gel (Balayan, 1960).

In 1961, serum dilutions ranging from 1:4 to 1:2048 were used in all the neutralization tests; in 1962, 631 sera were tested in dilutions of 1:4 to 1:2048, 82 sera in dilutions beginning at 1:8, 49 sera in dilutions beginning at 1:16 and 7 sera in dilutions beginning at 1:32. Both in 1961 and in 1962, serum dilutions ranging from 1:4 to 1:64 were used in the complement-fixation and precipitation tests.

### RESULTS

In 1961, sera from 575 children aged 1-15 years were submitted to the neutralization test (Table 1).

TABLE 1  
AGE DISTRIBUTION OF POLIOVIRUS NEUTRALIZING ANTIBODY AMONG 575 CHILDREN,  
AUTUMN 1961

Age (years)	Number of children tested	Triple-negative children (%)	Triple-positive children (%)	Children with antibody for:					
				Type 1		Type 2		Type 3	
				%	Mean titre <sup>a</sup>	%	Mean titre <sup>a</sup>	%	Mean titre <sup>a</sup>
1	20	5.0	80.0	85.0	1:49	90.0	1:112	85.0	1:79
2	44	0	93.2	95.6	1:138	100	1:275	97.8	1:69
3	53	0	98.1	98.1	1:84	100	1:194	100	1:60
4	39	2.6	97.4	97.4	1:84	97.4	1:169	97.4	1:49
5	63	0	96.8	98.4	1:91	100	1:128	100	1:45
6	32	0	96.9	96.9	1:74	100	1:120	100	1:56
7	32	0	100	100	1:64	100	1:91	100	1:45
8	55	0	100	100	1:45	100	1:97	100	1:39
9	52	0	98.1	100	1:74	100	1:112	100	1:49
10	31	0	100	100	1:91	100	1:37	100	1:64
11	32	0	100	100	1:74	100	1:37	100	1:34
12	39	0	97.4	97.4	1:49	100	1:56	100	1:28
13	31	0	96.8	96.8	1:45	100	1:42	96.8	1:15
14	29	0	96.6	96.6	1:49	100	1:45	100	1:21
15	23	0	100	100	1:49	100	1:30	100	1:16
Total	575	0.3	97.4	97.9	1:69	99.5	1:97	98.9	1:39

<sup>a</sup> Geometric mean titre for children with antibody.

Only two of the children (0.3%) were triple-negative. Antibodies for all three types of poliovirus were found in 561 children (97.4%), and for types 1, 2 and 3, respectively, in 97.9%, 99.5% and 98.9% of the children. The percentage distribution of neutralizing antibody by age indicated that the greatest deficiency was in the youngest age-group. Only 80% of 1-year-old children were triple-positive, while antibodies for type 1, type 2 and type 3 were found in 85%, 90% and 85% of the children, respectively. At 2 years of age, 93% of the children were triple-positive, and in the older age-groups, 97-100% were triple-positive.

The over-all geometric mean titres of neutralizing antibody for types 1, 2 and 3 polioviruses in the positive sera examined in 1961 were 1:69, 1:97 and 1:39, respectively. It is interesting to note that even in the 1-year age-group the geometric mean titres were fairly high (1:49, 1:112 and 1:79).

In addition to being tested for virus-neutralizing antibody, 106 sera were subjected to both complement-fixation and precipitation tests and an additional 499 sera to the precipitation test alone.

The complement-fixation test with types 1, 2 and 3 poliovirus antigens was positive in 42%, 43% and 44%, respectively, of the 106 children examined (Fig. 1). About half of the positive sera had titres of 1:4 and about a third had titres of 1:8. Only 7%, 4% and 7% of the 106 sera tested had titres of 1:16 to 1:64 of complement-fixing antibody for types 1, 2 and 3, respectively.

The sera from the same children gave positive results in the precipitation test with types 1, 2 and 3 poliovirus antigens much less frequently—7.5%, 22.6% and 15.1%, respectively (Table 2). This appears to be due to the more rapid disappearance of precipitating antibody than of complement-fixing antibody.

TABLE 2  
COMPARISON OF THE RESULTS OF COMPLEMENT-FIXATION (CF) AND  
PRECIPITATION (P) TESTS ON 106 SERA FROM CHILDREN, AUTUMN 1961

Type of poliovirus	CF+ P+	CF+ P-	CF- P+	CF- P-	Total			
					CF+		P+	
					No.	%	No.	%
Type 1	8	36	0	62	44	41.5	8	7.5
Type 2	18	27	6	55	45	42.5	24	22.6
Type 3	9	38	7	52	47	44.3	16	15.1

Analysis of the results of precipitation tests on the total of 605 sera indicated that precipitating antibody for type 1 poliovirus was somewhat less prevalent than precipitating antibodies for types 2 and 3 (Fig. 2; Table 3). The high rate of positivity for type 3 poliovirus precipitating antibody in school-children is noteworthy, since it suggests that the implantation of type 3 poliovirus in children occurs particularly frequently after revaccination.

In children under 3 years of age who gave a positive reaction to the precipitation test, the geometric mean titres were slightly higher for type 1 poliovirus than for types 2 and 3. On the average, the precipitating-antibody titres in children of different ages were similar.

The presence of precipitating antibody in re-vaccinated children appears to indicate that fresh infection of the alimentary tract has occurred.

In the autumn of 1962, 7-10 months after mass vaccination with trivalent vaccine, serum specimens from 769 children aged 6 months to 15 years were subjected to the neutralization test. As mentioned above, dilutions of 1:4 to 1:2048 were used for 631 of the sera and dilutions beginning at 1:8, 1:16 or 1:32 for the remainder.

The results of the 1962 neutralization tests are presented in Table 4 and Fig. 3. Table 4 analyses the data on the 631 children whose sera were tested in dilutions of 1:4 to 1:2048; Fig. 3 compares the same data with those on the 769 children whose sera were tested in dilutions of 1:32 and higher. It can be seen from Table 4 that 97% of the 631 children were triple-positive, and that 99.0%, 99.4% and 97.6% of them had antibodies for types 1, 2 and 3, respectively. The corresponding proportions of the 769 children with antibody titres of 1:32 or higher were: triple-positive, 79.6%; type 1, 87.5%; type 2, 94.5%; and type 3, 86.2%.

Table 4 and the upper half of Fig. 3 show that of the children aged 6-11 months, 87% had antibody for all three types of poliovirus in titres of 1:4 or higher; of those aged 1-5 years, 94-98%; and, in the older age-groups, 95-100%. By comparison, the percentages of children with antibody titres for all three types of 1:32 or higher (lower half of Fig. 3) were found in only 36% of children under 1 year,

FIG. 1  
RESULTS OF COMPLEMENT-FIXATION TESTS ON 106 SERA  
FROM CHILDREN, AUTUMN 1961

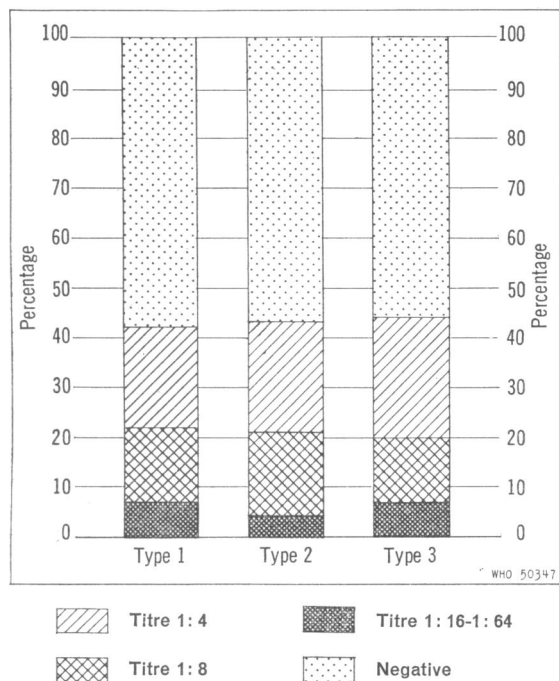
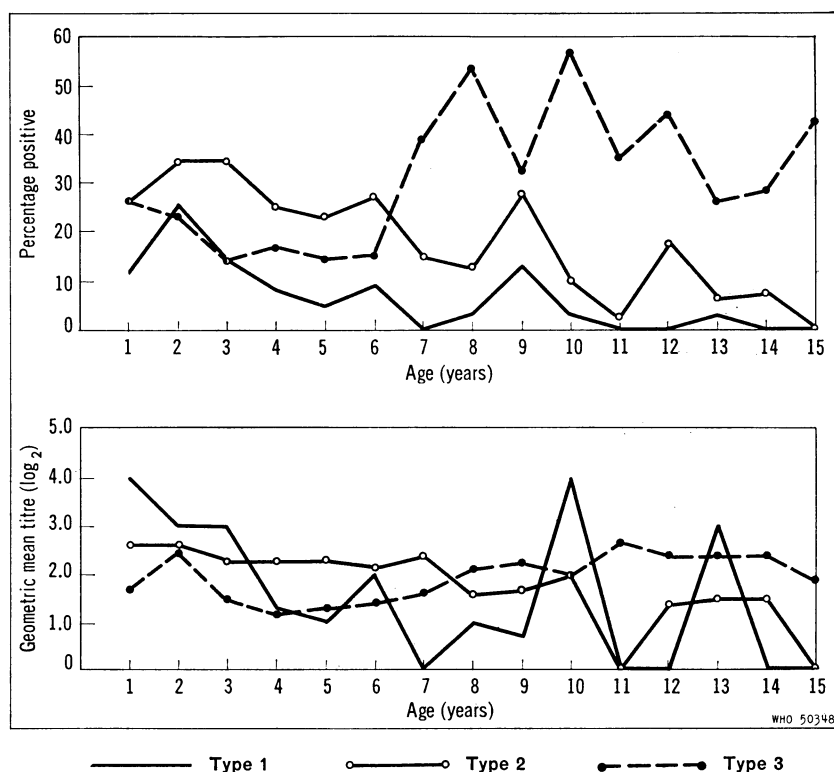


FIG. 2  
AGE DISTRIBUTION OF POLIOVIRUS PRECIPITATING ANTIBODY AND OF GEOMETRIC  
MEAN TITRES AMONG 605 CHILDREN, AUTUMN 1961



66% of 1-year-old children, 79-85% of children aged 2-7 years and 87-98% of schoolchildren.

The geometric mean antibody titres of the sera that reacted in dilutions of 1:4 or higher were similar in different age-groups and averaged 1:42 for type 1, 1:69 for type 2 and 1:30 for type 3 (Table 4). Despite this, it is noteworthy that a considerable number of children under 7 years of age had antibody titres below 1:32, indicating an apparently inadequate local resistance.

In the autumn of 1962, serum specimens from 767 children were examined by the precipitation test (Table 5; Fig. 4). The sera were obtained 7-10 months after mass vaccination, and they very rarely (in only three cases) contained precipitating antibody for type 1 poliovirus. Precipitating antibody for type 2 was found in 49 children (6.4%). As in 1961, precipitating antibody for type 3 poliovirus was the most common, being found in 298

children (38.8%). The type 3 precipitating antibody titre in some of the children was as high as 1:32 or 1:64, whereas the rare type 1 precipitating antibody titres were only 1:4 or 1:8. The geometric mean antibody titres were similar in different age-groups and averaged 1:4.9 for type 1, 1:8.6 for type 2 and 1:9.8 for type 3.

The highest percentages of children without precipitating antibodies for any type of poliovirus (triple-negatives) were in the age-groups under 1 year and 1 year (82% and 88%, respectively). In older children the percentages ranged from 33 to 67. Of the total of 767 children examined, 448 (58.4%) had no precipitating antibody for any type of poliovirus.

In the autumn and winter of 1961, the Laboratory of Immunology of Enteroviruses examined serum specimens from 109 children who had been vaccinated with live vaccine shortly after birth, and during their first year of life received one, two or three

TABLE 3  
AGE DISTRIBUTION OF POLIOVIRUS PRECIPITATING ANTIBODY AMONG 605 CHILDREN,  
AUTUMN 1961

Age (years)	Number of children tested	Children with antibody for:						Geometric mean titre (log <sub>2</sub> )		
		Type 1		Type 2		Type 3		Type 1	Type 2	Type 3
		No.	%	No.	%	No.	%			
1	27	3	11.1	8	25.9	7	25.9	4.0	2.6	1.7
2	56	14	25.0	19	33.9	13	23.2	3.0	2.6	2.5
3	59	8	13.8	20	33.8	8	13.8	3.0	2.3	1.5
4	36	3	8.3	9	25.0	6	16.7	1.3	2.3	1.2
5	62	3	4.8	14	22.6	9	14.5	1.0	2.3	1.3
6	33	3	9.1	9	27.3	5	15.2	2.0	2.1	1.4
7	33	0	0	5	15.2	13	39.4		2.4	1.6
8	56	2	3.6	7	12.5	30	53.6	1.0	1.6	2.1
9	54	7	13.0	15	27.8	17	31.5	0.7	1.7	2.3
10	30	1	3.3	3	10.0	17	56.7	4.0	2.0	2.0
11	34	0	0	1	2.9	12	35.2			2.7
12	39	0	0	7	17.9	17	43.6		1.4	2.4
13	31	1	3.2	2	6.5	8	25.8	3.0	1.5	2.4
14	29	0	0	2	6.9	8	27.6		1.5	2.4
15	26	0	0	0	0	11	42.3			1.9
Total	605	46	7.6	121	20.0	181	29.9	2.2	2.1	2.0

revaccinations with trivalent vaccine. Serum specimens were collected from these children when they were 9-18 months old—the age at which children usually lose maternally transmitted antibodies. The results showed that there were no triple-negative children; 83% were triple-positive, and 86%, 93% and 97% had antibodies for types 1, 2 and 3, respectively.

#### DISCUSSION AND CONCLUSIONS

The results of serological investigations of children in Moscow in 1961 and 1962 can be compared with the results of a similar investigation of 466 children conducted in Moscow in 1959, before the introduction of oral vaccination with Sabin live vaccine.

Fig. 5 shows that in 1959 neutralizing antibodies for type 1 poliovirus were found in children as follows: 1 year old, 15%; 2 years old, 29%; 3 years old, 64%; 4 years old, 76%; 6 years old, 67%; and

in the age-group 7-10 years, 91%. Neutralizing antibodies for type 2 poliovirus developed slightly earlier. At one year of age they were found in 37% of children, at 2 years in 51%, at 3 years in 69%, at 4 years in 85% and at 6 years in 90% of children. The curve of the age distribution of type 3 poliovirus neutralizing antibody is similar to that for type 1, while that for the triple-negatives shows a drop from 54% of the 1-year-old children to 0 in the age-group 7-10 years.

By comparison, the age distribution of neutralizing antibodies in 1961 indicates that only a very small proportion of children were triple-negative. At the same time it should be noted that neutralizing antibody titres in young children are considerably lower than those in children of school age; this fact emerges clearly from the results of the 1962 investigation (see Fig. 3).

Comparison of the results obtained in 1961 in the complement-fixation test and the precipitation test, using the same sera, indicated a more rapid

TABLE 4  
AGE DISTRIBUTION OF POLIOVIRUS NEUTRALIZING ANTIBODY AMONG 631 CHILDREN, AUTUMN 1962

Age (years)	Number of children tested <sup>a</sup>	Triple-positive children (%)	Children with antibody for:					
			Type 1		Type 2		Type 3	
			%	Mean titre <sup>b</sup>	%	Mean titre <sup>b</sup>	%	Mean titre <sup>b</sup>
Under 1 <sup>c</sup>	30	86.7	96.7	1 : 34	96.7	1 : 128	90.0	1 : 79
1	60	95.0	100	1 : 28	96.7	1 : 91	95.0	1 : 42
2	75	97.3	98.7	1 : 24	100	1 : 52	98.7	1 : 26
3	77	93.5	96.1	1 : 28	100	1 : 60	96.1	1 : 28
4	43	97.7	100	1 : 32	100	1 : 60	97.7	1 : 26
5	43	97.7	100	1 : 49	97.7	1 : 104	97.7	1 : 28
6	45	100	100	1 : 45	100	1 : 64	100	1 : 23
7	43	100	100	1 : 79	100	1 : 64	100	1 : 24
8	32	100	100	1 : 56	100	1 : 60	100	1 : 37
9	35	100	100	1 : 56	100	1 : 97	100	1 : 32
10	36	97.2	97.2	1 : 64	100	1 : 91	97.2	1 : 42
11	27	100	100	1 : 97	100	1 : 79	100	1 : 45
12	16	100	100	1 : 60	100	1 : 32	100	1 : 23
13	26	100	100	1 : 60	100	1 : 52	100	1 : 24
14	28	96.4	100	1 : 39	100	1 : 56	96.4	1 : 26
15	15	93.3	100	1 : 52	100	1 : 69	93.3	1 : 24
Total	631	97.0	99.0	1 : 42	99.4	1 : 69	97.6	1 : 30

<sup>a</sup> There were no triple-negative children.

<sup>b</sup> Geometric mean titre for children with antibody.

<sup>c</sup> 6-11 months.

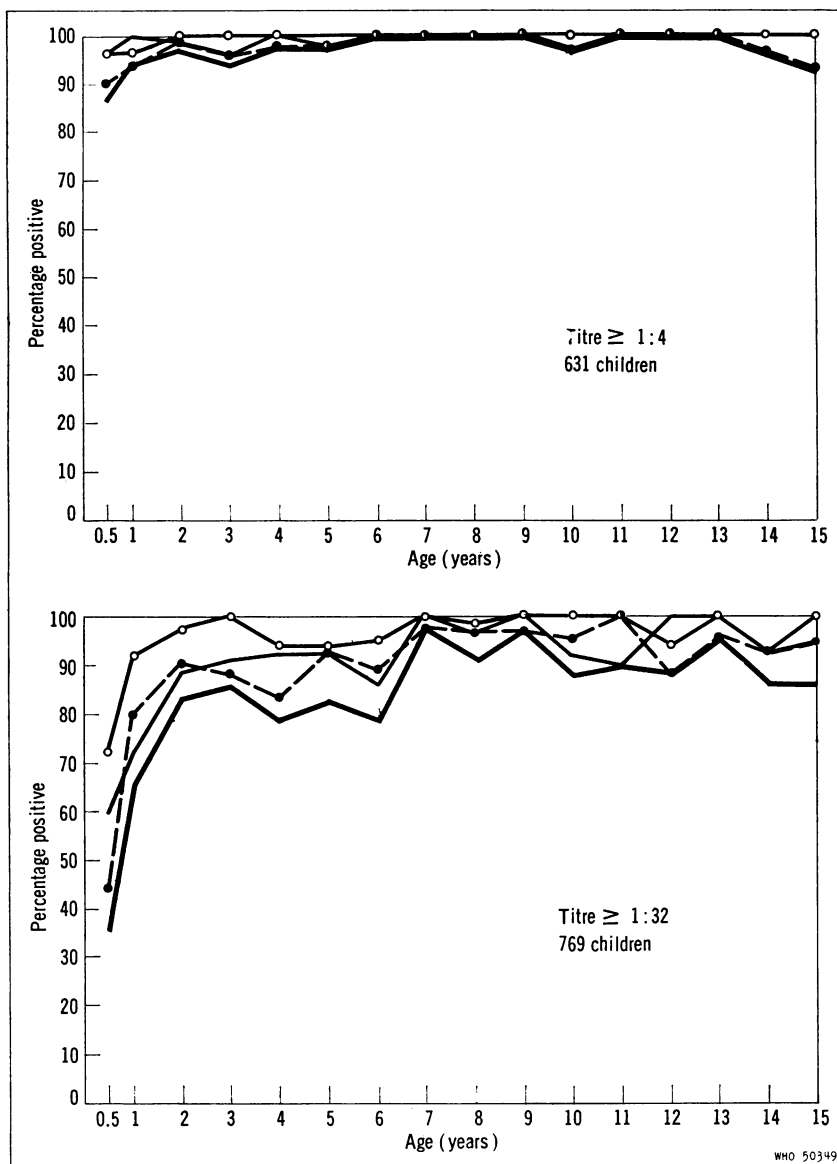
disappearance of precipitating antibody than of complement-fixing antibody. However, considerable persistence of precipitating antibody, particularly for type 3, in a significant proportion of children should be noted. Of 180 children who had been given oral vaccine more than 6 months before serum collection, 1.1% had precipitating antibody for type 1 poliovirus, 7.8% for type 2 and 38.3% for type 3. It may be suggested that the high percentage of positive reactions with type 3 antigen was due to the longer persistence of type 3 virus after revaccination with trivalent vaccine, which in turn was due to insufficient primary immunization with the type 3 vaccine strain. It should be remembered, however, that the type 3 vaccine "takes" more successfully in children with naturally acquired antibody than do

vaccine strains of types 1 and 2. This peculiar feature of immunity produced by type 3 poliovirus infection requires further study.

Of the total of 767 children tested for precipitating antibodies in the autumn of 1962, 7-10 months after a mass campaign of live poliovirus immunization, only 448 (58.4%) were triple-negative. These data should be kept in mind when poliovirus precipitating antibodies are found in suspected cases.

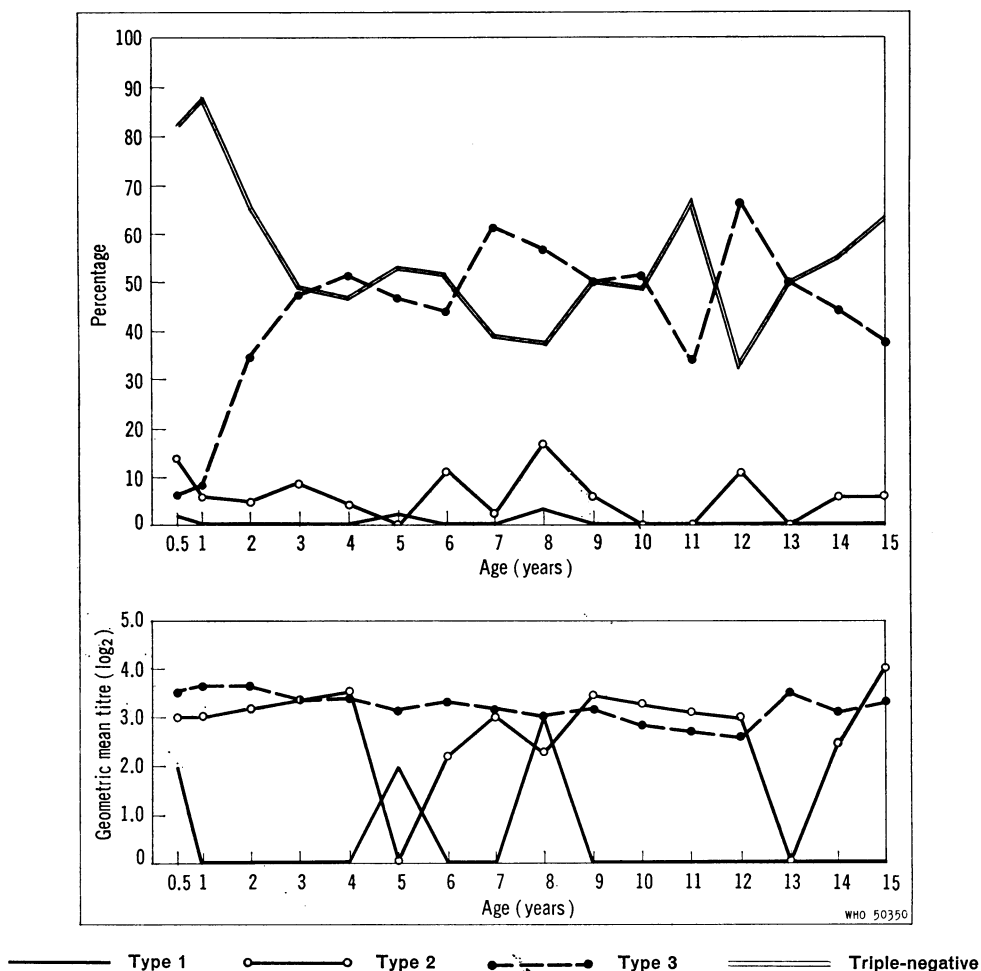
The presence of precipitating and complement-fixing antibodies in children of different ages indicates the occurrence of fresh infection in a considerable proportion of the children as a result of revaccination. This may be considered a manifestation of insufficient resistance of the alimentary tract in these children.

FIG. 3  
AGE DISTRIBUTION OF POLIOVIRUS NEUTRALIZING ANTIBODY: AUTUMN 1962 SURVEY



— Type 1    ○ — Type 2    ● — Type 3    — Triple-positive

FIG. 4  
AGE DISTRIBUTION OF POLIOVIRUS PRECIPITATING ANTIBODY AND OF GEOMETRIC  
MEAN TITRES AMONG 767 CHILDREN, AUTUMN 1962



The results of the serological examination for neutralizing antibody of children who had received live vaccine shortly after birth are of some interest. Fig. 6 compares the percentages of positive reactions found in 1961 among 109 infants of 9-18 months who had been vaccinated during the first days of life with those among 105 unvaccinated children in the same age-group whose sera were examined in 1959.

Of the children examined in 1959, 5%, 20% and 17% had antibody for types 1, 2 and 3, respectively. There were no triple-positive children, and 62% were triple-negative.

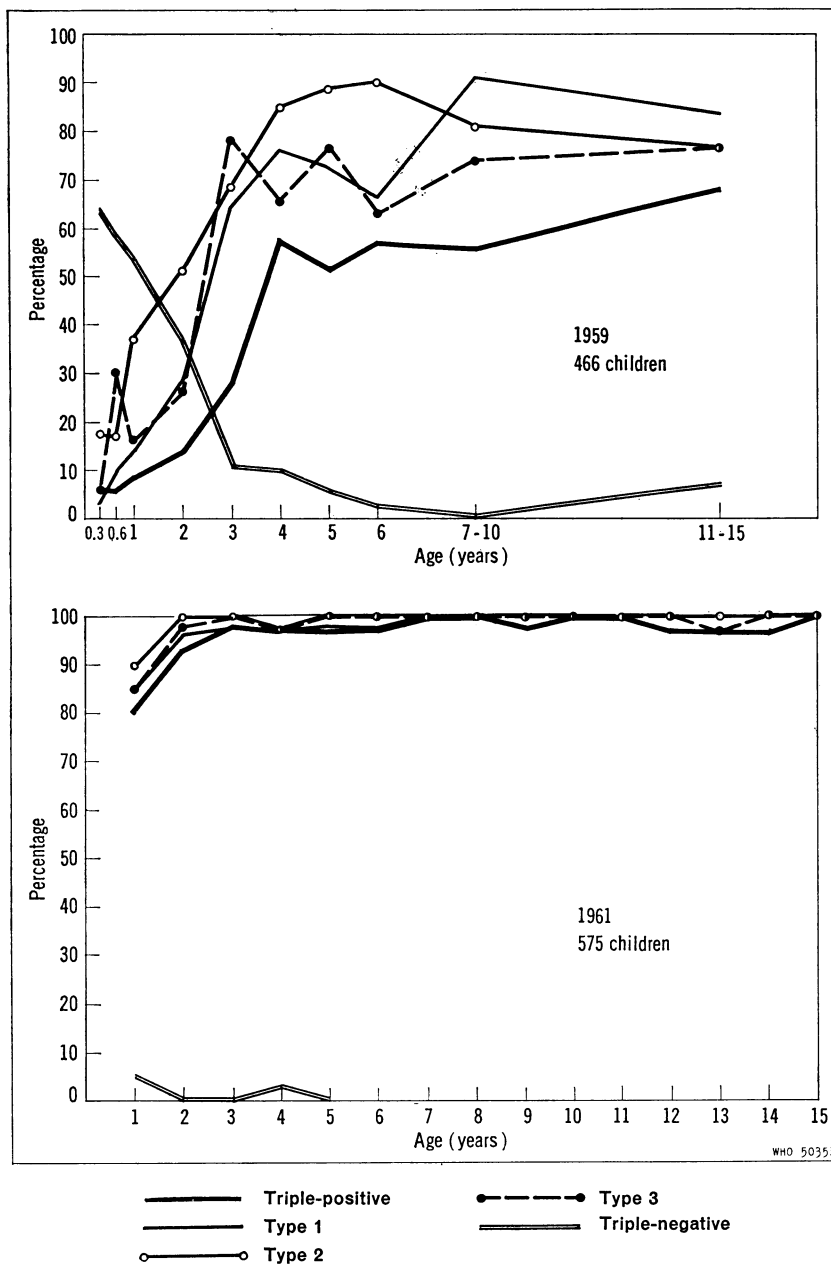
Of the children examined in 1961, 83% were triple-positive; none was triple-negative; and 86%, 93% and 97% had antibodies for types 1, 2 and 3 poliovirus, respectively. Antibodies in high titres (1:64 to 1:2048) were found in 41%, 59% and 52% of the children, respectively.

The geometric mean antibody titres (log<sub>2</sub> values) in these two groups of children are compared in Fig. 7. In the 1959 group, they were 0.3, 1.3 and 0.8 for types 1, 2 and 3, respectively, whereas in the 1961 group they reached 4.6, 5.8 and 5.4, respectively.

The results indicate that stable immunity for all three types of poliovirus may be achieved in the



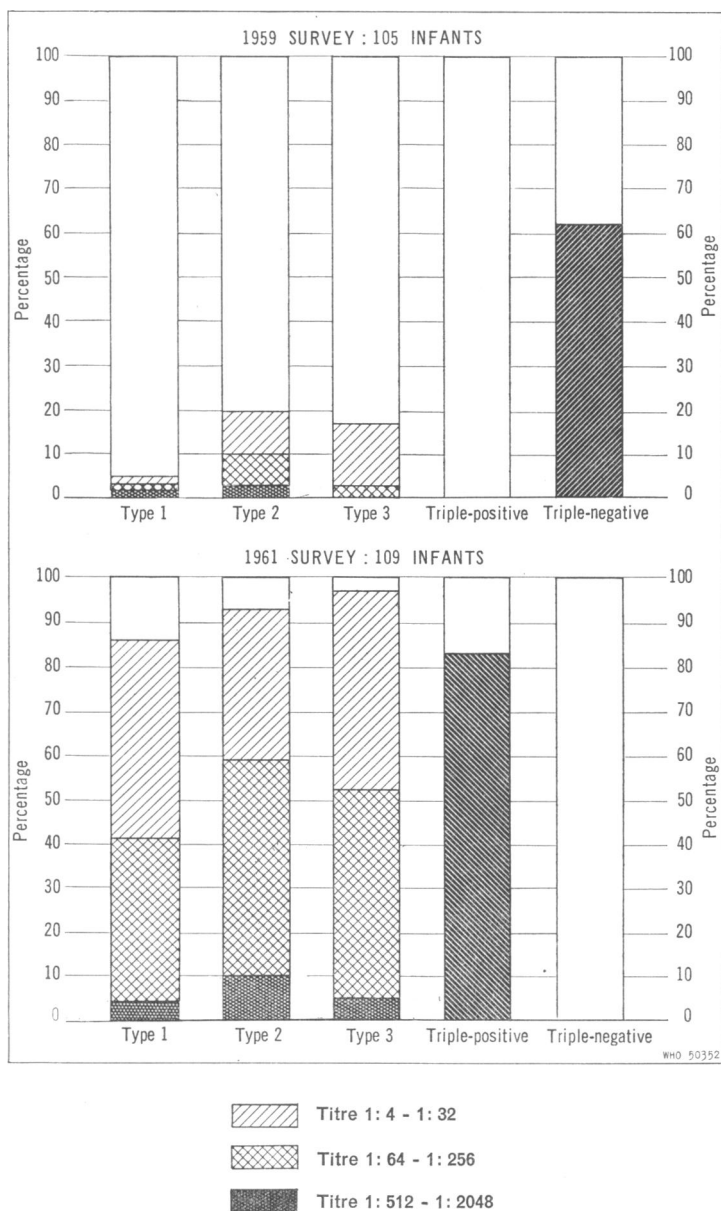
FIG. 5  
COMPARISON OF AGE DISTRIBUTION OF POLIOVIRUS NEUTRALIZING ANTIBODY<sup>a</sup> AMONG CHILDREN IN 1959  
(BEFORE MASS VACCINATION WITH SABIN LIVE ORAL VACCINE)  
WITH THAT IN 1961 (AFTER MASS VACCINATION)



<sup>a</sup> Serum titres of 1:4 or higher.

FIG. 6

COMPARISON OF NEUTRALIZING ANTIBODY RESPONSE OF INFANTS AGED 9-18 MONTHS IN 1959 (BEFORE MASS VACCINATION WITH SABIN LIVE VACCINE) WITH THAT OF INFANTS IN THE SAME AGE-GROUP IN 1961 WHO HAD BEEN VACCINATED SHORTLY AFTER BIRTH



**TABLE 5**  
**AGE DISTRIBUTION OF POLIOVIRUS PRECIPITATING ANTIBODY AMONG 767 CHILDREN,**  
**AUTUMN 1962**

Age (years)	Number of children tested	Triple- negative children (%)	Triple- positive children (%)	Children with antibody for:					
				Type 1		Type 2		Type 3	
				%	Mean titre <sup>a</sup>	%	Mean titre <sup>a</sup>	%	Mean titre <sup>a</sup>
Under 1 <sup>b</sup>	72	81.9	0	1.4	1 : 4.0	13.9	1 : 8.0	5.5	1 : 11.3
1	86	88.4	0	0		5.8	1 : 8.0	8.1	1 : 12.1
2	88	64.8	0	0		4.5	1 : 9.2	34.1	1 : 12.1
3	85	49.4	0	0		9.4	1 : 9.2	48.2	1 : 9.8
4	53	47.2	0	0		3.8	1 : 11.3	50.9	1 : 10.6
5	51	52.9	0	2.0	1 : 4.0	0		47.0	1 : 9.2
6	57	50.9	0	0		10.5	1 : 4.6	43.8	1 : 9.8
7	44	38.6	0	0		2.3	1 : 8.0	61.4	1 : 8.6
8	35	37.1	2.8	2.8	1 : 8.0	17.1	1 : 4.9	57.1	1 : 8.0
9	36	50.0	0	0		5.5	1 : 11.3	50.0	1 : 9.2
10	39	48.7	0	0		0		51.3	1 : 7.5
11	30	66.7	0	0		0		33.5	1 : 6.5
12	18	33.3	0	0		11.1	1 : 8.0	66.7	1 : 6.1
13	26	50.0	0	0		0		50.0	1 : 11.3
14	31	54.8	0	0		6.4	1 : 5.7	45.2	1 : 8.6
15	16	62.5	0	0		6.2	1 : 16	37.5	1 : 9.8
Total	767	58.4	2.8	0.4	1 : 4.9	6.4	1 : 8.6	38.8	1 : 9.8

<sup>a</sup> Geometric mean titre for children with antibody.

<sup>b</sup> 6-11 months.

**TABLE 6**  
**COMPARISON OF GEOMETRIC MEAN ANTIBODY TITRES ACQUIRED**  
**FROM IMMUNIZATION WITH ORAL LIVE POLIOVIRUS VACCINE,**  
**FROM LATENT INFECTION, AND FROM PARALYTIC POLIOMYELITIS**

Group	Number of children tested	Geometric mean titre of poliovirus neutralizing antibody (log <sub>2</sub> )		
		Type 1	Type 2	Type 3
Live vaccine immunization	109	5.4	6.1	5.4
Latent infection	105	6.4	6.1	4.8
Paralytic poliomyelitis:				
Type 1	96	7.0		
Type 2	22		6.3	
Type 3	21			5.0

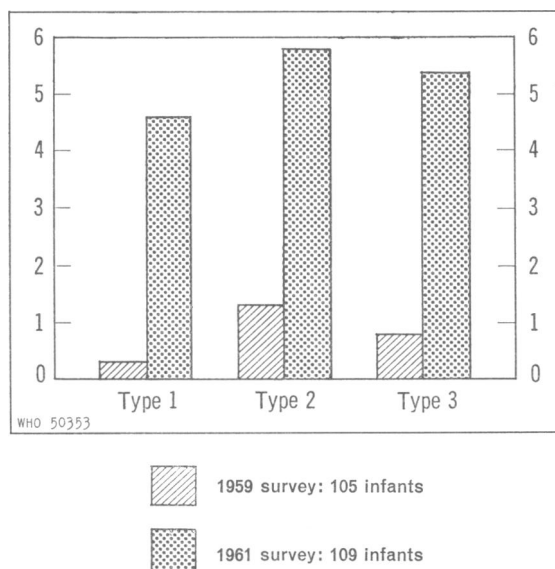
TABLE 7  
COMPARISON OF NEUTRALIZING ANTIBODY RESPONSE IN CHILDREN FIRST  
IMMUNIZED SHORTLY AFTER BIRTH WITH THAT IN CHILDREN  
FIRST IMMUNIZED AT 2 MONTHS OF AGE

Beginning of immunization schedule	Number of children tested <sup>a</sup>	Percentage of children positive for neutralizing antibody			
		Triple-positive	Type 1	Type 2	Type 3
First days of life	109	83.2	86.2	93.4	97.3
2 months of age	91	92.3	98.9	96.7	93.4

<sup>a</sup> The children in both groups were aged 9-18 months at the time of testing.

FIG. 7

COMPARISON OF GEOMETRIC MEAN TITRES (LOG<sub>2</sub>)  
OF NEUTRALIZING ANTIBODY IN INFANTS AGED 9-18  
MONTHS IN 1959 (BEFORE MASS VACCINATION WITH  
SABIN LIVE VACCINE) AND IN INFANTS OF THE SAME  
AGE-GROUP IN 1961 WHO HAD BEEN VACCINATED  
SHORTLY AFTER BIRTH



majority of children by early and repeated vaccination of young infants. It is interesting to note from Table 6 the similarity between the levels of antibody developing after immunization with live vaccine, the levels acquired as a result of natural latent infection, and the levels developing after an attack of paralytic poliomyelitis.

However, the observed deficiency in antibodies, particularly for type 1 poliovirus, both in children first vaccinated in early infancy and in those who received the vaccine shortly after birth, has indicated the necessity for frequent revaccination. It should be mentioned here that, as can be seen from Table 7, the neutralizing antibody response of children aged 9-18 months was no better among those vaccinated in the first days of life than among those first vaccinated at the age of 2 months. Accordingly, immunization with live poliomyelitis vaccine shortly after birth should be regarded as inexpedient.

Taking into account the organizational problems of mass vaccination and the materials available, we recommend the carrying out of immunization with a single preparation of trivalent vaccine on a schedule providing immunization of all children aged 2-12 months once quarterly and of children aged 1-4 years once annually in winter time, with a final revaccination at the age of 13-14 years.

## RÉSUMÉ

En 1961 et 1962, deux et trois ans après une campagne de vaccination de masse contre la poliomyélite par le vaccin vivant atténué de Sabin, une enquête sérologique a été menée à Moscou pour déterminer la valeur de l'immunité acquise par les enfants.

En 1961, les sérums de 605 enfants âgés de 6 mois à 15 ans furent examinés. On décéla des anticorps neutra-

lisants pour les trois types de poliovirus chez 97,4% de 575 sujets, les taux respectifs pour les virus des types 1, 2 et 3 étant de 97,9%, 99,5% et 98,9%. Les enfants les plus jeunes présentaient les taux les plus bas: 80% à 1 an, 93% à 2 ans; 97-100%, en revanche, chez les enfants plus âgés. Le test de fixation du complément effectué sur 106 sérums montra la présence d'anticorps pour les

poliovirus des types 1, 2 et 3 respectivement dans 42%, 43% et 44% des cas. Pour le test de précipitation, les pourcentages furent de 7,5%, 22,6% et de 15,1%.

Lors d'une enquête similaire en 1962, 7-10 mois après revaccination par deux doses de vaccin trivalent, l'examen des sérums d'un groupe d'enfants montra la présence chez 97% d'entre eux d'anticorps neutralisants pour les 3 types de poliovirus, et d'anticorps pour les virus des types 1, 2 et 3 respectivement chez 99%, 99,4% et 97,6% des sujets. Sur un total de 767 enfants, 448 (58,4%) ne possédaient pas d'anticorps précipitants 7-10 mois après la revaccination, les pourcentages les plus élevés étant observés dans les groupes d'âge de moins de 1 an (82%)

et de 1 an (88%). L'existence, après revaccination, d'anticorps précipitants et d'anticorps fixant le complément chez des enfants d'âge différent donne à penser qu'il y a eu une proportion importante de nouvelles infections.

Les auteurs estiment qu'il est possible d'obtenir une immunité stable envers les trois types de poliovirus chez la majorité des enfants en procédant à des vaccinations répétées. Ils recommandent, comme schéma d'immunisation, la vaccination des enfants âgés de 2 à 12 mois par un vaccin trivalent, une fois tous les trois mois, celle des enfants de 1 à 4 ans une fois par an, et une dernière revaccination vers l'âge de 13-14 ans.

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